NO ANCHOR LOSS WITH ALTERED FORCE APPLICATION - A CASE REPORT

Miglani Anil*, N K Ahuja**

Orthodontic anchorage is simply defined as the ability to limit the movement of some teeth while achieving the desired movement of other teeth. However, orthodontists have been striving for the most appropriate methods & appliances to achieve this goal. The present case is of a 30 yrs old male patient having bimaxillary Protrusion, Class I molar relationship and was treated using lingual force application rather than conventional buccal force application. Zero anchorage loss was achieved by lingual force without using any extra or intra oral devices. The biomechanics employed for lingual force application is described to achieve the desired anchorage control.

Key- words – Anchorage, Bimaxillary protrusion, Force applications

Bimaxillary dentoalveolar protrusion is one of the most prevalent malocclusion in Asian population[1]. Traditionally orthodontic treatment involves the extraction of four first premolars[2] and demands the least amount of anchorage loss. Hence, the use of headgear and implants is unavoidable fate of these patients.[3]

Anchorage control[4] in literal sense involves limiting unwanted tooth movements while achieving the desired movement. Anchorage is to be considered in 3 planes of space – horizontal, vertical and transverse.

Horizontally anchorage control means limiting the mesial movement of posterior segment. Vertically, anchorage control involves the limitation of vertical skeletal and dental movement in posterior segments, where as laterally, it comprises the maintenance of arch width.

There are definite biomechanical advantages whenever the forces are applied from lingual surface of teeth.[5]

Vector of orthodontic forces applied to anterior teeth are lingual to center of resistance. As a result, distally uprighting forces are applied to the posterior teeth through the arch wire, which makes posterior teeth more resistant to anchorage loss.

* *Associate Professor*
** *Principal & Head, Department of Orthodontics, Subharti Dental College, Delhi-Haridwar By pass road, Subhartipuram, Meerut, India*

Posterior anchorage is lost in labial force application as posterior teeth rotate mesially. In lingual force application, distally rotating forces are constantly applied to molar during en masse retraction, thus providing a greater amount of molar anchorage.

In the reported case of a 30 yrs old male patient having class I molar relationship with severe bimaxillary protrusion, dramatic changes were achieved without any extra or intra oral anchorage devices.

CASE REPORT

A 30 years old male patient reported to department of Orthodontics with chief complaint of proclined upper teeth. On examination it was observed that the patient had normal facial form without any asymmetry having severe convex profile and excessive lip strain during closure. (Fig-1)

The patient had class I molar relationship on both sides with severely protruded upper and lower incisors, increased over jet of 6 mm, overbite of 3 mm (Fig. 2). As per the cephalometric analysis (Fig. 4) there were class II Skeletal pattern with an ANB angle of 7.5° and a Mandibular plane angle of 29°. Both upper and lower incisors displayed severe dentoalveolar protrusion (U_1 to NA 10 mm & 32°, L_1 to NB 15 mm & 31°) and reduced interincisal angle (97°). The case was diagnosed as class I bimaxillary dentoalveolar protrusion on class II skeletal bases.

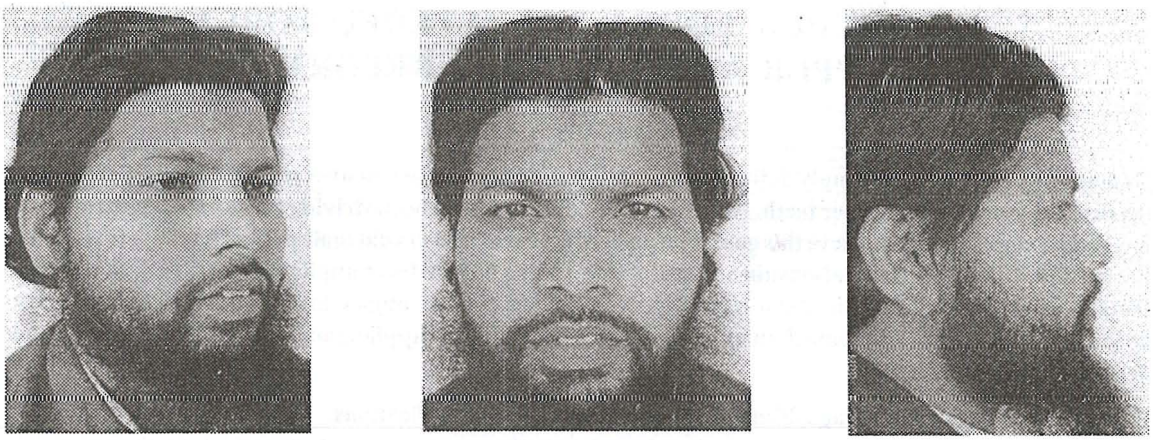


Fig. 1 Extra-oral Pre-treatment

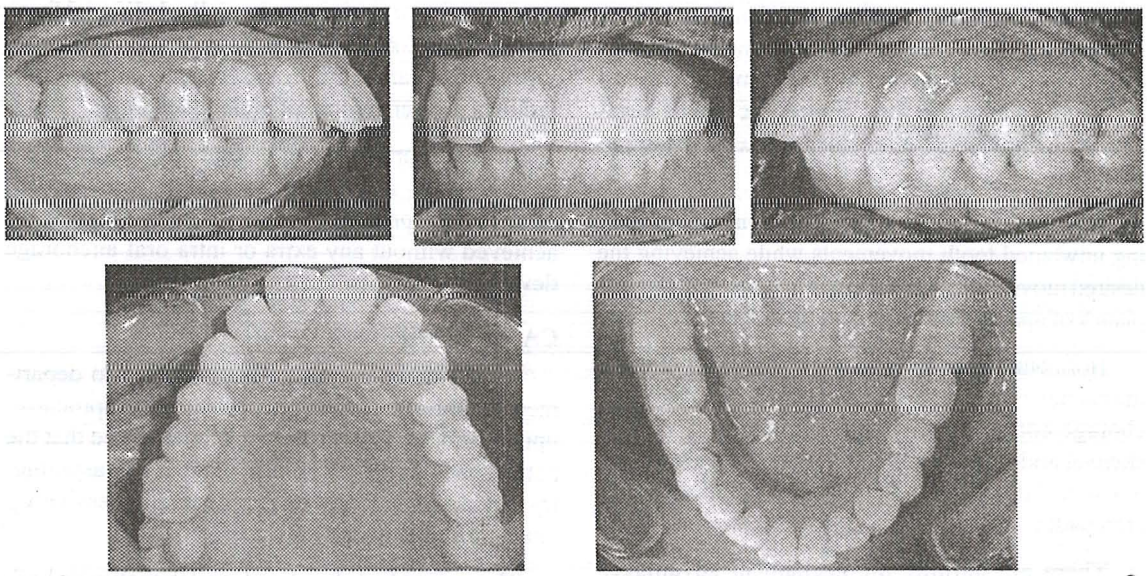


Fig. 2 Intra-oral Pre-treatment

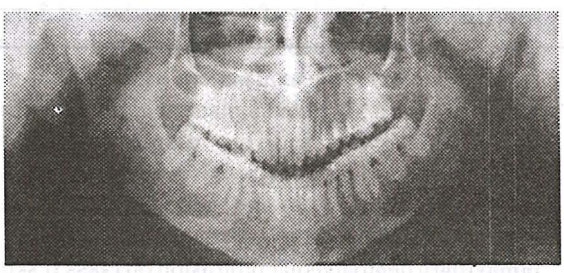


Fig. 3 Panoramic radiograph Pre-treatment

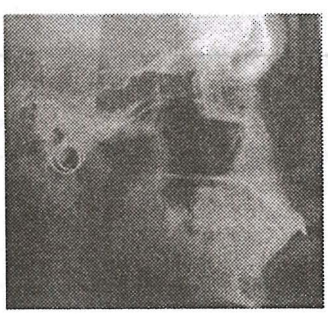


Fig. 4 Lateral cephalogram Pre-treatment

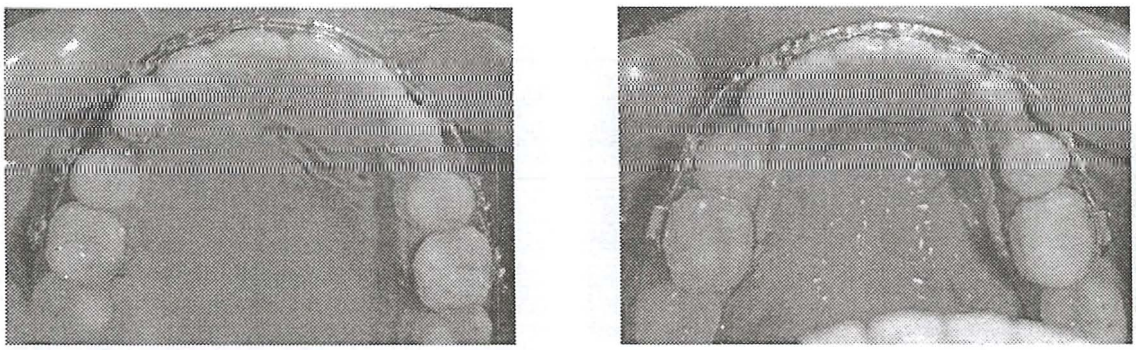


Fig. 5 During treatment retraction with lingual force



Fig. 6 Extra oral Post-treatment

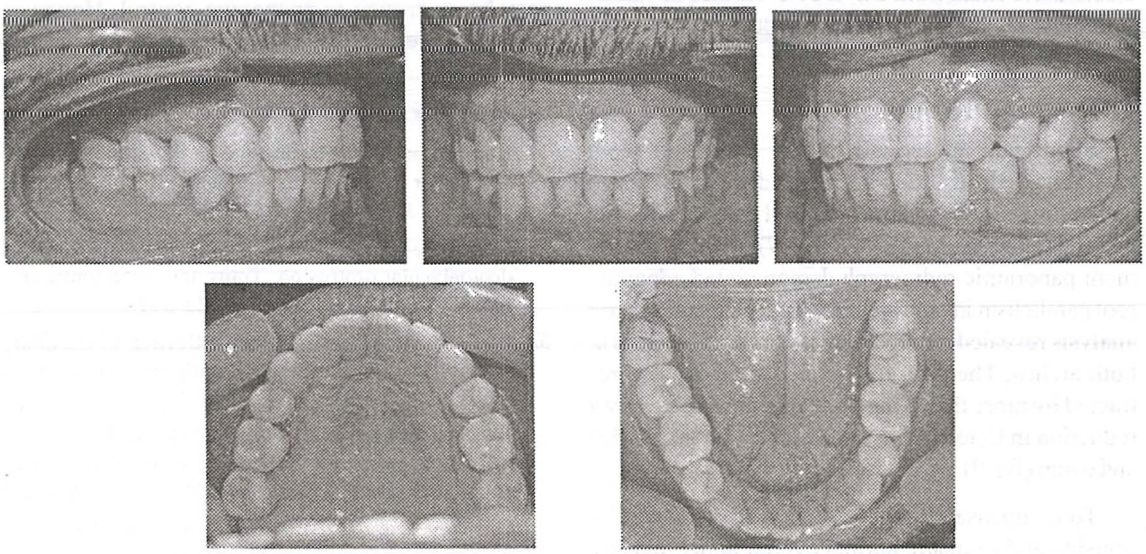
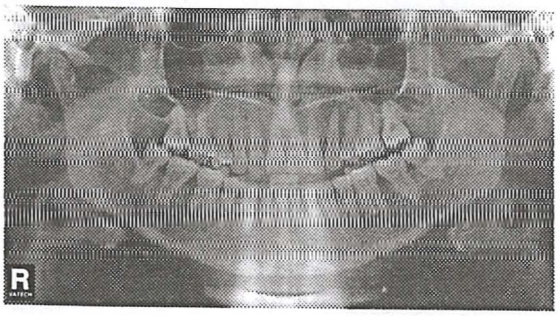
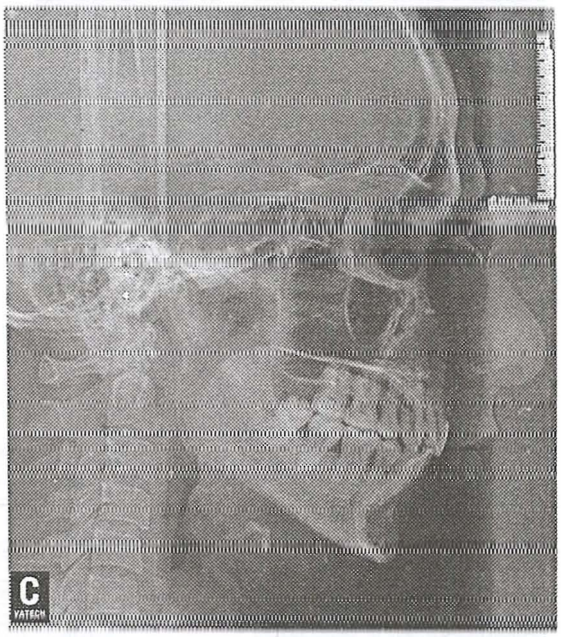


Fig. 7 Intra oral Post-treatment





TREATMENT MECHANICS

The treatment involved the extraction of all four first premolars under local anesthesia followed by the use of upper and lower pre-adjusted edgewise appliances (0.022" Roth prescription) and lingual cleats on lingual surface of upper and lower canine and first molar.

To achieve leveling and aligning, 016" NiTi arch wire was placed for two months and thereafter 016" Australian stainless steel wire was used for another two months. After due leveling and aligning, 017" X 025" stainless steel archwire with curve of spee in upper and reverse curve of spee in lower were placed during retraction. To achieve the anterior retraction, elastomeric chain from LINGUAL surface of canine to molar was applied rather than buccal. The force level was approximately 200 gm in each quadrant.

TREATMENT RESULT

Significant retraction of upper and lower teeth was achieved, resulting in reduced mentalis strain and improved chin contour. An ideal anterior overbite and overjet were established (Fig 7). The post treatment panoramic radiograph demonstrated adequate root parallelism in both arches. (Fig. 8) Cephalometric analysis revealed remarkable retraction of incisors in both arches. The protruded upper incisors were retracted by more than 8 mm. which was reflected by a reduction in U_1 to NA 16^0 and 2 mm and L_1 to NB 32^0 and 6 mm (fig. 9).

To compensate for severe class II skeletal relationship and to ensure normal overjet upper incisors were over retracted whereas lower incisors were left proclined. Remarkable achievement recorded was zero anchorage loss.

CONCLUSION

It appears lingual force application as a routine may be an answer to anchorage control. However, further studies are required to recommend the clinical efficacy of altered force application in all cases.

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